EDITORIAL

This special issue grew out of the 13th Quantitative Analyses Symposium held at Harvard University. The topic of the symposium was the Nature of Reinforcement. The program committee consisted of Michael L. Commons, John W. Donahoe, Edmund Fantino, and Alejandro Kacelnik. After initial editorial work by the program committee, the materials were submitted to the *Journal of the Experimental Analysis of Behavior* for consideration as a special issue. After acceptance, the regular refereed review processes ensued. Additional papers were also solicited.

This issue examines many aspects of reinforcement, including the question of how reinforcing events reinforce, what makes such events reinforcing—in short, the nature of reinforcement. This issue integrates diverse approaches to reinforcement. These include computer scientists and engineers examining neural networks and neuroscientists, physiologists, psychologists, and zoologists whose approaches range from biological and behavioristic to physiological and evolutionary. The organization of the issue recognizes the interdependence of these approaches while providing space for their individual exposition, affording a synergetic and comprehensive portrait of the nature of reinforcement. A special effort has been made to integrate contributions of experienced researchers with those of younger authors studying reinforcement. Given their breadth of background, the special issue addresses a broad audience. Among these are computer scientists and engineers, psychologists, neuroscientists, graduate students, and advanced undergraduates.

The issue begins with a paper by Ringen that examines, from a philosophical point of view, the adequacy of a selectionist view of reinforcement. A provocative suggestion emerging from Ringen's analysis is that contemporary cognitivist theorizing is, of necessity, teleological and therefore inconsistent with current natural-science philosophy. Donahoe, Burgos, and Palmer elaborate in detail the selectionist approach and suggest ties to studies of neural networks. Stein's contribution illustrates directly how reinforcement may operate at the real neural level. Donahoe et al. argue for a unified concept of reinforcement that combines effects in both operant and respondent procedures. Crawford, Holloway, and Domjan support this suggestion in their provocative analyses of sexual reinforcement. Reboreda and Kacelnik illustrate the utility of known behavioral relations in trying to understand social interactions between starlings. The paper by Panlilio and Weiss illustrates nicely that when a compound stimulus with auditory and visual components is employed, the modality that gains control is related to the behavioral valence of the contingency signaled by the complex and is not a genetically "hard-wired" outcome. Timberlake's contribution continues the ethological trend begun in the paper by Crawford et al. He places reinforcement in the larger context of natural selection. His behavior systems approach incorporates the response-deprivation conceptualization elaborated more fully by Allison, who also uses the conceptualization to draw ties to economic theory. Green and Freed illustrate well how the use of economic concepts can aid in understanding and predicting reinforcing effects. Fantino, Preston, and Dunn provide a concise review of the influential and successful delay-reduction theory, and Grace offers a suggestion that solves a problem for which the delay-reduction model has failed. His expansion of what should be considered context is provocative. Galbicka, Kautz, and Jagers illustrate powerful effects of locally dynamic contingencies. These data argue strongly that a full understanding of reinforcement will require an account of temporally local effects. Killeen, Cate, and Tran provide both useful data concerning the types of feeds employed as reinforcers for pigeons and an informative illustration of the utility of scaling techniques. Iversen has produced impressive schedule-controlled behavior using access to wheel running as an effective reinforcer for rats. The production of appropriately patterned perfor-

mance under intermittent reinforcement is an important validation of wheel running as reinforcement.

As the foregoing summary illustrates, reinforcement is a broadly applicable concept, almost amazingly so. It is a useful concept in virtually every behavioral realm. This special issue illustrates both that fact and that the concept provides a firm foundation for continuing research in the analysis of behavior.

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